IN THE CLAIMS

Please amend the claims as follows:

1. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

at least a portion of the input waveguides including a contraction taper configured to contract ~~taper~~ the width of a light signal traveling along the input waveguide toward the output waveguide, wherein the contraction tapers do not taper vertically.

2. (canceled)

3. (original) The device of claim 1, wherein at least a portion of the contraction tapers taper from an expanded end to a contracted end having a width less than 30 % of the width of the expanded end.

4. (original) The device of claim 1, wherein at least a portion of the contraction tapers have a contracted end with width greater than 12 μm.

5. (original) The device of claim 1, wherein at least a portion of the contraction tapers have a taper ratio in a range of than 8:1 to 200:1, the taper ratio being a ratio of the taper length:the taper width.

6. (currently amended) The device of claim 1, wherein at least one output waveguide includes an expansion taper configured to expand a light signal traveling along the output waveguide away from the input wavguides.

7. (original) The device of claim 6, wherein the expansion tapers do not taper vertically.

8. (original) The device of claim 6, wherein the expansion tapers expand from a contracted end to an expanded end, the contracted end having a width less than 80 % of the width of the expanded end.

9. (original) The device of claim 6, wherein at least a portion of the expansion tapers have a taper ratio in a range of 8:1 to 200:1, the taper ratio being a ratio of the taper length:the taper width.

10. (original) The device of claim 1, wherein one or more of the waveguide intersections is constructed such that a waveguide configured to carry output from the intersection has a width greater than a width of each waveguide configured to carry input to the intersection.

11. (currently amended) The device of claim 1, wherein ~~lateral sides of~~ the waveguides have lateral sides that extend down to the base.

12. (original) The device of claim 1, wherein the waveguides are silicon.

13. (original) The device of claim 1, wherein one or more of the waveguides end at a facet that is substantially vertical relative to a base, each facet being angled at less than ninety degrees relative to a direction of propagation of a light signal traveling along the waveguide at the facet.

14. (original) The device of claim 1, further comprising:

one or more inactive regions spaced apart from the waveguides so as to define waveguide trenches adjacent to the waveguides.

15. (original) The device of claim 1, wherein the waveguides have a thickness between 16 μm and 75 μm and a width between 16 μm and 75 μm.

16. (currently amended) The device of claim 1, wherein each waveguide has a width that ~~the thickness of the waveguides~~ is more than 1.4 times a ~~the~~ width of the waveguide.

17. (previously presented) The device of claim 1, further comprising:

a plurality of light sources for generating light signals, each light source being positioned in a recess on the base such that a light signal generated by the light source enters an input waveguide.

18. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

the output waveguide ~~one or more output waveguides~~ including ~~a~~ an expansion taper configured to expand ~~taper~~ the width of a light signal traveling along the output waveguide after having traveled through an input waveguide,

wherein the expansion tapers do not taper vertically.

19. (canceled)

20. (original) The device of claim 18, wherein at least a portion of the expansion tapers taper from an expanded end to a contracted end having a width less than 30 % of the width of the expanded end.

21. (original) The device of claim 18, wherein at least a portion of the expansion tapers have a contracted end with width greater than 10 μm.

22. (original) The device of claim 18, wherein at least a portion of the expansion tapers have a taper ratio in a range of than 8:1 to 200:1, the taper ratio being a ratio of the taper length: the taper width.

23.-34. (canceled)

35. (previously presented) The device of claim 1, wherein the waveguides are immobilized along their length relative to the base.

36. (previously presented) The device of claim 18, wherein the waveguides are immobilized along their length relative to the base.

37. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

at least a portion of the input waveguides including a contraction taper configured to contract ~~taper~~ the width of a light signal traveling along the input waveguide toward the output waveguide, and

wherein one or more of the waveguides end at a facet that is substantially vertical relative to a base, each facet being angled at less than ninety degrees relative to a direction of propagation of a light signal traveling along the waveguide at the facet.

38. (previously presented) The device of claim 37, wherein at least a portion of the facets that are angled at less than ninety degrees relative to the direction of propagation are positioned at the end of a contraction taper.

39. (previously presented) The device of claim 37, wherein at least a portion of the contraction tapers taper from an expanded end to a contracted end having a width less than 30 % of the width of the expanded end.

40. (previously presented) The device of claim 37, wherein at least a portion of the contraction tapers have a contracted end with width greater than 12 μm.

41. (previously presented) The device of claim 37, wherein at least a portion of the contraction tapers have a taper ratio in a range of than 8:1 to 200:1, the taper ratio being a ratio of the taper length:the taper width.

42. (previously presented) The device of claim 37, wherein at least one output waveguide includes an expansion taper configured to expand a light signal traveling along the output waveguide.

43. (previously presented) The device of claim 42, wherein the expansion tapers expand from a contracted end to an expanded end, the contracted end having a width less than 80 % of the width of the expanded end.

44. (previously presented) The device of claim 42, wherein at least a portion of the expansion tapers have a taper ratio in a range of 8:1 to 200:1, the taper ratio being a ratio of the taper length:the taper width.

45. (previously presented) The device of claim 37, wherein one or more of the waveguide intersections is constructed such that a waveguide configured to carry output from the intersection has a width greater than a width of each waveguide configured to carry input to the intersection.

46. (previously presented) The device of claim 37, wherein lateral sides of the waveguides extend down to the base.

47. (previously presented) The device of claim 37, wherein the waveguides are silicon.

48. (previously presented) The device of claim 37, further comprising:

one or more inactive regions spaced apart from the waveguides so as to define waveguide trenches adjacent to the waveguides.

49. (previously presented) The device of claim 37, wherein the waveguides have a thickness between 16 μm and 75 μm and a width between 16 μm and 75 μm.

50. (currently amended) The device of claim 37, wherein each waveguide has a thickness that ~~the thickness of the waveguides~~ is more than 1.4 times a ~~the~~ width of the waveguide.

51. (previously presented) The device of claim 37, further comprising:

a plurality of light sources for generating light signals, each light source being positioned in a recess on the base such that a light signal generated by the light source enters an input waveguide.

52. (previously presented) The device of claim 37, wherein the waveguides are immobilized along their length relative to the base.

53. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

the output waveguide ~~one or more output waveguides~~ including ~~a~~ an expansion taper configured to expand ~~taper~~ the width of a light signal traveling along the output waveguide after having traveled through an input waveguide, and

wherein one or more of the waveguides end at a facet that is substantially vertical relative to a base, each facet being angled at less than ninety degrees relative to a direction of propagation of a light signal traveling along the waveguide at the facet.

54. (previously presented) The device of claim 53, wherein at least a portion of the facets that are angled at less than ninety degrees relative to the direction of propagation are positioned at the end of an expansion taper.

55. (currently amended) The device of claim ~~52~~ 53, wherein at least a portion of the expansion tapers taper from an expanded end to a contracted end having a width less than 30 % of the width of the expanded end.

56. (currently amended) The device of claim ~~52~~ 53, wherein at least a portion of the expansion tapers have a contracted end with width greater than 10 μm.

57. (currently amended) The device of claim ~~52~~ 53, wherein at least a portion of the expansion tapers have a taper ratio in a range of than 8:1 to 200:1, the taper ratio being a ratio of the taper length: the taper width.

58. (currently amended) The device of claim ~~52~~ 53, wherein the waveguides are immobilized along their length relative to the base.

59. (currently amended) The device of claim ~~52~~ 53, wherein each waveguide has a ~~the~~ thickness that ~~of the waveguides~~ is more than 1.4 times a ~~the~~ width of the waveguide.

60. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

at least a portion of the input waveguides including a contraction taper configured to contract ~~taper~~ the width of a light signal traveling along the input waveguide toward the output waveguide,

and wherein each waveguide has a ~~the~~ thickness that ~~of the waveguides~~ is more than 1.4 times a ~~the~~ width of the waveguide.

61. (previously presented) The device of claim 60, wherein the waveguides are immobilized along their length relative to the base.

62. (currently amended) An optical device, comprising:

multi-mode waveguides positioned on a base, ~~such that a plurality of~~ the waveguides ~~serve as~~ including input waveguides, transition waveguides, and ~~one or more of the waveguides serve as~~ an output waveguide,

the waveguides intersecting one another such that the transition waveguides carry light signals from the input waveguides to the output waveguide and combine the light signals ~~traveling along a plurality of the input waveguides are combined~~ onto the ~~an~~ output waveguide,

the output waveguide ~~one or more output waveguides~~ including ~~a~~ an expansion taper configured to expand ~~taper~~ the width of a light signal traveling along the output waveguide after having traveled through an input waveguide, and

wherein each waveguide has a ~~the~~ thickness that ~~of the waveguides~~ is more than 1.4 times a ~~the~~ width of the waveguide.

63. (previously presented) The device of claim 62, wherein the waveguides are immobilized along their length relative to the base.

64. (new) The device of claim 1, wherein the waveguides intersect one another in accordance with a Y-type multiplexer.

65. (new) The device of claim 64, wherein the waveguides include at least four input waveguides.

66. (new) The device of claim 1, wherein a pair of the input waveguides intersect at one of the transition waveguides such that the light signals traveling along the pair of input waveguides are transferred from the input waveguides to the transition waveguide interscted by the pair of input waveguides.

67. (new) The device of claim 1, wherein the each input waveguide that include a contraction tapers terminates at a transition waveguides and excludes an expansion taper between the contraction taper and the transition waveguide at which the input waveguide terminates.